Addendum to the March 1, 2008, Technical Review Document
for
Renewal Operating Permit 95OPBO082
CEMEX, Inc. – Lyons Cement Plant
Boulder County, Colorado, Source ID 013/0003
July 16, 2009

I. Introduction

This Addendum is in response to the April 20, 2009, Order from EPA responding to a Petition filed by Rocky Mountain Clean Air Action (RMCAA) on March 19, 2008. In that Order, EPA stated that:

> As the permitting authority, CDPHE has a responsibility to respond to significant comments. *See, e.g., In the Matter of Onyx Environmental Services*, Petition V-2005-1 (February 1, 2006), cited in *In the Matter of Kerr-McGee, LLC, Frederick Gathering Station*, Petition-VIII-2007 (February 7, 2008) (*Kerr-McGee Final Order*) ("it is a general principle of administrative law that an inherent component of any meaningful notice and opportunity for comment is a response by the regulatory authority to significant comments"). Sierra Club's comment on the two alleged modifications raised in this petition was a significant comment because it raised an issue that the title V permit for the CEMEX Lyons Cement Plant may be missing certain applicable requirements and a compliance schedule for these requirements, in violation of 40 C.F.R. part 70. CDPHE's response, which referred to its past decisions without any citations or summary of the basis for those decisions, or any further explanation, was not an adequate response. *See Kerr-McGee Final Order*, at 4. As mentioned above, in reviewing a petition to object to a title V permit raising concerns regarding a permitting authority's PSD permitting decision, EPA generally will look to see whether Petitioner has shown that the permitting authority did not comply with its SIP-approved PSD regulations or whether the State's exercise of discretion under such regulations was unreasonable or arbitrary. In its response to this significant comment by Sierra Club, CDPHE failed to provide the basis (*e.g.*, citing to current or historical evidence, or the lack thereof) that supports its conclusion that PSD/NSR was not applicable at the time these two projects were undertaken by the Lyons Cement Plant. Therefore, I grant the petition on this issue and direct CDPHE to address the comment on the PSD issues for these two projects and, as necessary, make appropriate changes to the permit. In doing so, I am not concluding that the projects triggered PSD/NSR – only that the present permit record does not provide the public with a meaningful response to its comment and lacks an adequate basis for the State's determination.

The Colorado Department of Public Health and Environment, Air Pollution Control Division (Division), is supplementing its response to comments and the permit record via this Addendum to the Technical Review Document, pursuant to EPA's Order.

II. Background

The Sierra Club submitted written comments to the Division on the draft Renewal Operating Permit on February 3, 2006. The Sierra Club stated that records in the Division's files indicated that the owners of the Lyon Cement Plant made several significant modifications to the kiln and a modification to allow the dryer to burn coal in addition to natural gas. The Sierra Club indicated that it did not appear that the facility went through New Source Review (NSR), a Best Achievable Control Technology (BACT) analysis and/or Prevention of Significant Deterioration (PSD) requirements contemporaneous with any of these modifications, although it appeared to the Sierra Club that some of these modifications resulted in increases of SO_2, NO_X and/or CO. The Sierra Club's comments went on to state the following:

> The Operating Permit Renewal Summary clearly states that "[t]his source is classified as a major stationary source with respect to Prevention of Significant Deterioration (PSD) requirements." We request that the State investigate this matter, apply NSR requirements, undertake a BACT analysis for NO_X and SO_2 emissions, and include new PSD limits for NO_X and SO_2 and/or a compliance plan for NO_X and SO_2 emissions in the final Title V permit for the kiln.
>
> If these requirements are not imposed in the final Title V permit, please provide a detailed explanation in your response to comments regarding your failure to include them. Please also explain why NSR, BACT, and PSD do not apply to these modifications.

The Division responded to the Sierra Club's comments in a December 5, 2007, letter as follows:

> The modifications you cite were evaluated under the rules that existed at the time of each modification, and determined to not trigger, or to net out of PSD review. The emissions increases were determined to meet regulatory requirements at the time of application, and are not part of the operating permit review.

In EPA's Order responding to Petition VIII-2008-001, EPA indicated that the permit record does not provide a meaningful response to the Sierra Club's comments, and directed the Division to prepare a more detailed response, such as with citations or summary of the basis for past decisions. The two comments of concern are as follows:

1. The allegations regarding the first PSD violation (regarding the kiln modification) are outlined in the RMCCA's notice of intent (NOI), attached to the Petition, where it alleges that:

   > According to information on file with the Division, the kiln at the cement plant was cut in half to reduce visible emissions. Information on file with the Division shows that this modification led to a significant increase in NO_X emissions. According to a 1980 stack test done by York Research, NO_X emissions after the modification were at 785 tons/year leading to a 508 ton/year

> increase over 1979 emission rates. This increase in NO_X emissions was significant and information on file with the Division strongly indicates a net emission increase occurred contemporaneous with this modification. Thus, a major modification of this major source occurred in 1979 or 1980; thereby triggering PSD review and permitting requirements. No PSD permit was obtained or otherwise applied for, in violation of federal PSD regulations at 40 CFR § 52.21. Thus, the Lyons Cement Plant has been in violation of the requirement to obtain a PSD permit from at least December 31, 1980 to present. NOI at 5.

2. The allegations concerning the dryer conversion are presented in RMCCA's NOI and it alleges that:

> In 1985, the dryer was modified to burn coal, rather than natural gas. This modification led to a significant increase in SO_2 emissions. Based on the information on file with the Division, SO_2 emissions increased from less than 1 ton/yr in 1980 and 1982 to 276 tons/year in 1985. Information on file with the Division also shows that a net emission increase occurred contemporaneous with the modification. A major modification of this major source therefore occurred in 1985. However, no PSD permit was obtained or otherwise applied for, in violation of federal PSD regulations at 40 CFR § 52.21. Thus, the Lyons Cement Plant has been in violation of the requirement to obtain a PSD permit from at least December 31, 1985 to the present. NOI at 7-8.

As directed by EPA, the Division is addressing the two alleged modifications and providing additional responses to the two Sierra Club comments.

III. Federal and State Permitting Authority

At the time of the two construction projects referenced above, the U.S. EPA (not the Division) was the PSD permitting authority in Colorado. Thus, if either of the projects had in fact triggered PSD, EPA would have had the responsibility for identifying the applicability of the program under the circumstances, and issuing the PSD permits.

The Division's initial permitting regulation (Colorado Regulation No. 3; 5 CCR 1001-5) was adopted by the Colorado Air Quality Control Commission (AQCC) on December 9, 1971, and was effective February 1, 1972. The first federal PSD review regulations were promulgated by EPA on December 5, 1974. These rules were later revised on June 19, 1978, and again on August 7, 1980. Subsequent revisions have been made to the federal PSD rules; they are not addressed here because they are not relevant to the modifications in question.

Provisions for locating sources in non-attainment areas were addressed in an Interpretative Ruling issued by EPA on December 21, 1976. This Ruling addressed locating new major

sources in areas with air quality worse than the national standard. Due to public comments on the Interpretative Ruling and changes required by the 1977 Clean Air Act Amendments, EPA's Interpretative Ruling was revised on January 16, 1979, and the Interpretative Ruling was codified in 40 CFR Part 51, Appendix S, "Emission Offset Interpretative Ruling."

There are two methods under which states can implement PSD review requirements -- either as a delegated state, or as a state implementation plan (SIP)-approved state. For a delegated state, the state implements the PSD program through rules promulgated by EPA. Once a state is a delegated state, they must implement EPA's PSD rules (including any future revisions to those rules) within a certain time period. For a SIP-approved state, the state adopts and promulgates its own rules (which must be at least as stringent as EPA's rules). Upon EPA's approval of those rules, the state can implement its own PSD rules. The State of Colorado is a SIP-approved State for purposes of PSD.

Colorado incorporated the August 7, 1980, PSD rules into AQCC Regulation No. 3 on March 10, 1983. The state regulations, however, were not implemented or in effect in Colorado until approved by EPA. EPA provided partial approval of Colorado's PSD rules on July 12, 1985, and granted final approval on September 2, 1986. Prior to receiving final approval on its PSD rules, an interim agreement between EPA and Colorado (dated October 4, 1983) was in place to allow for Colorado's participation in the PSD review process. However, prior to granting final approval of Colorado's PSD rules on September 2, 1986, EPA was the permitting authority for PSD permits. Indeed, in April 1985, EPA sent a letter to Southwest Portland Cement requesting information to determine the potential applicability of PSD review requirements to the Lyons Cement Plant. EPA requested data relating any actual increases and decreases in NO_X and SO_2 emissions during the past five years. EPA has never advised the Division that any changes at the plant triggered PSD. It is questionable whether it is now appropriate for the Division, in the context of a 2008 operating permit renewal, to provide the basis for prior matters where EPA possessed ultimate legal authority. Nonetheless, the Division is complying with EPA's Order through this Addendum.

IV. The Alleged Major Modifications

A. 1979-1980 Conversion from Long-Dry Kiln to Shortened Kiln with Flash Vessel

The Lyons Cement Plant was constructed in 1968 by Martin Marietta. Martin Marietta submitted a construction permit application on April 23, 1979, regarding the kiln. The Division had directed Martin Marietta to make changes to their kiln in order to eliminate and/or minimize the blue haze surrounding the plant that resulted from the volatilization of kerogens in the raw materials. The long dry kiln was shortened and the roaster (which was previously used to volatilize kerogens) was replaced with a flash vessel (which acts similar to a pre-calciner). Prior to the kiln conversion, the roaster and dryer were considered one system. As a result, construction permits were issued for both the dryer and kiln on October 18, 1979. At the time that this project was permitted, the area in which the plant was located was designated as non-attainment for total suspended particulates (TSP), CO and ozone (NO_X was not considered to be a precursor under the rules in place at the time), and was designated as attainment for SO_2 and NO_X.

1. Non-attainment issue discussion

At the time of the Construction permit issuance, Colorado Regulation No. 3 specified that sources with potential (uncontrolled) emissions over 100 tons/yr of a pollutant for which the area was non-attainment would have to achieve the lowest achievable emission rate (LAER) for the specific source category and achieve emission reductions (offsets) greater than one-for-one on an individual pollutant basis. In addition, the applicant had to certify that all other existing sources of 100 tons/yr or more that were owned, operated, or controlled by the applicant in the state were in compliance with all applicable AQCC emissions standards or regulations, or were subject to and in compliance with an enforceable compliance schedule. These requirements in Regulation No. 3 were consistent with the requirements in EPA's Interpretative Ruling (both the December 21, 1976, and January 1, 1979, versions).

The construction permits issued on October 18, 1979, included a letter of understanding between the Division and the source that addressed these three Regulation No. 3 requirements. The October 18, 1979, letter indicated that the Division considered that LAER would be achieved through use of the proposed control equipment, that the applicant had certified that each source of 100 tons/yr or more was in compliance with applicable requirements, and that offsets were obtained for particulates, CO and non-methane hydrocarbons, by discontinuing certain operations. The Preliminary Analysis that was prepared on August 2, 1979, indicates that emissions from all pollutants (including SO_2 and NO_X) would decrease with this kiln conversion. In conclusion, the files show that the Division appropriately reviewed the permit application and applied the rules applicable to the kiln that applied at the time.

2. Attainment (PSD) issue discussion

Good quality test data did not exist in the late 1970's to establish baseline emissions for the long dry kiln, the roaster or the dryer. The only available actual emission data for the kiln was from a 1976 performance test conducted by York Research. A later test was conducted in 1980 by York Research and this test indicated a decrease in emissions for all pollutants from the 1976 "baseline" test. However, subsequent tests conducted in 1985, 1987, 1988 and 1990 indicated reductions in some pollutants and increases in other pollutants from the 1976 level.

In light of the minimal data on "baseline" emissions, and the variable and inconclusive data on "post-project" emissions, in the early 1990's the Division used its best professional judgment in assessing whether a major modification had occurred in 1980 that would have triggered PSD review. For example, as part of a 1993 process for revising the Construction permits for the kiln and dryer, the Division considered the 1980 kiln conversion (which, as previously noted, occurred at a time when EPA had ultimate authority for the PSD program in Colorado). In a November 23, 1993, Preliminary Analysis (PA) summary, the permit engineer noted that, based on available information at that time, NO_X emissions from a long dry kiln are significantly higher than emissions from pre-heater/pre-calciner kilns. Specifically, the PA summary indicated that EPA's "Alternative Control Techniques Document; Control of NOx Emissions from Cement Manufacturing" (February 1993 draft)**,** included such an emissions comparison at Table 2-1, and that EPA's document further provided that "new cement kiln constructions or renovations of older kilns thus predominantly involve precalciner designs for their energy

efficiency. The inherent energy efficiency of these kiln designs is likely to produce less NOx emissions per unit amount of clinker as compared to the long wet or dry kilns." Since the flash vessel at the Lyons plant acted as a pre-calciner, the modification was thus expected to result in a decrease in NO_X emissions. In addition, due to the elimination of the roaster, the Division reasonably assumed that there was no increase in either SO_2 or VOC emissions. Finally, the Division noted that there was no reason to believe that particulate matter and CO emissions would have increased with the modification to the kiln. Therefore, the Division concluded in 1993 that the modification made to the kiln in 1979-1980 should not have resulted in an increase in emissions.

Moreover, in 1985 EPA requested NO_X and SO_2 emission increase information from the facility, allowing EPA to assess the applicability of PSD permitting requirements for the facility, and EPA never informed the Division, or the source, that PSD permitting requirements applied as a result of the 1980 kiln conversion. EPA was the agency with PSD jurisdictional authority at the time.

It should be noted that the PSD rules in place at the time of this modification were the June 19, 1978, version. In regard to the definition of "major modification," those rules were significantly different from the current rules in two ways. First, in Colorado the current definition of major modification is based on a "significant net emission increase" which is determined from a comparison of pre-project *actual* emissions to post-project *potential* emissions. The June 1978 definition was based on a comparison of pre-project *potential* emissions to post-project *potential* emissions, which typically would result in a lower level of emission increase than the current rules. Second, the level required for a "significant" emission increase (in tons per year) was, with the exception of CO, much less stringent in 1978 than in the current rules. For example, the significance levels for NO_X and SO_2, which are the primary pollutants of concern in this instance, were 100 tons per year (TPY) under the 1978 rules and are currently 40 TPY.

B. 1985 Modification to Raw Materials Dryer to Allow Coal Burning

Southwestern Portland Cement Company (the owner of the Lyons cement plant following Martin Marietta) submitted an application on October 5, 1984, to burn coal as the dryer's primary fuel, with natural gas to be used as a back-up fuel. The dryer was previously permitted to burn fuel oil and natural gas. At the time the permit application was submitted, the area in which the source was located was designated as non-attainment for TSP, CO and ozone (NOx was not considered to be a precursor under the rules in place at the time), and attainment for SO_2 and NO_X. In processing the permit application, the Division indicated that under Regulation No. 3 this change might result in a significant net emission increase for NO_X and possibly SO_2. As a result, in a December 17, 1984, letter the Division notified the source and EPA of the possible need to obtain a PSD permit from EPA (EPA was the permitting authority for PSD until September 2, 1986) and requested that the source determine baseline emissions.

A revised Construction permit was issued on April 8, 1985, to allow the dryer to burn coal as its primary fuel. The revised Construction permit included emission limitations for PM, SO_2, NO_X and CO, throughput limits for raw materials and fuels (coal and natural gas) and a requirement to conduct performance tests for PM, NO_X and SO_2. The performance test requirements were

evidently included because there was a concern by the Division that the emission factors used to set the permit limits (the "potential" emissions) were not specific to the type of emission unit, *i.e.* a coal-fired dryer. For all pollutants except particulate matter, AP-42 factors for coal-fired boilers were used to set the permit limits (*i.e.* the "potential" emissions) because there were no AP-42 cement dryer factors for CO, NO_X or SO_2.

The only pre-1985 testing conducted on the dryer was done by York Research in 1982, and that test was conducted only for SO_2 and TSP and only with the dryer burning natural gas (at the time, the dryer was permitted to burn both natural gas and fuel oil). Post-modification testing was conducted in 1985, 1987 and 1988 and was inconclusive, showing a high variability in the results for SO_2 and NO_X. Absent good baseline emission information, and given the fact that 1) the emission factors for NO_X and SO_2 available to set the new "potential" emissions for coal-burning were not specific to the type of emissions unit, and 2) it was thought that SO2 emissions may be much lower due to interaction with the raw material (primarily limestone), it was difficult to determine whether or not the conversion to coal had triggered a major modification.

In 1993, the source again submitted an application to revise the permit for the dryer to increase the emission limitations and the throughput limits (raw materials, as well as coal and natural gas) for the dryer. At that time, the Division notified the source that the modification would likely trigger PSD review requirements. Rather than undergoing PSD review, the source decided to revert back to using natural gas as the primary fuel for the dryer with coal used only as a backup during emergencies and natural gas curtailments. That Construction permit was issued on December 17, 1993.

In switching back to natural gas as the primary fuel in 1993, the Division considers that the dryer was returned to its operating conditions prior to the 1985 modification. As previously discussed, minimal and inconclusive emissions data made it very difficult to ascertain whether a major modification may have occurred in 1985 with respect to the dryer. If such a modification did occur, EPA would have been responsible for identifying it with the source, and issuing the PSD permit. This issue was arguably mooted by the return to natural gas as the primary fuel.

EPA's Order states that the Division did not adequately cite to "current or historical evidence" in responding to comments. There are significant legal and policy concerns if EPA is now asking state and federal permitting authorities to revisit permitting decisions made decades ago. Indeed, the Division is not revisiting its previous permitting decisions, but rather supplementing its responses to comments for the renewable operating permit action, in accordance with EPA's Order. Nonetheless, in response to EPA's invitation to look at "current and historical evidence," in responding to this Order the Division reviewed its files and notes that it appears that PSD significance levels were never exceeded on an actual emissions basis. Based on the information in the inspection reports conducted from 1985 to 1993, it appears that the quantity of coal actually consumed in the dryer during each year was much less than the permitted level. The highest annual coal consumption was 4,005 tons (1985), which is about 54% of the annual permit limit for coal consumption (7,446 tons/yr). The second highest year of coal usage was 1987 (2,218 tons). Using the emission factors that were used to set the permit limits in 1985 (from AP-42 for NO_X and SO_2: from Section 1.1, external combustion sources - bituminous and sub-bituminous coal combustion, NO_X 15 lbs/ton and SO_2 35S lbs/ton, S = 0.47) and the 1985

actual coal usage (4,005 tons), calculated actual emissions of NO_X and SO_2 were 30 and 33 tons/yr, respectively; both of which are below the PSD significance level.

As discussed previously, the emission factors used to set the permit limits were not specific to the type of emission unit. However, these factors were used in the above analysis, which was conducted in response to this Order, since they represent what was available at the time of the permit modification. In general, the emission data reported from the stack tests do not provide emission *factors* for coal combustion. While the stack test data does provide emission *rates* in lbs/hr, and although there is information in past inspection reports regarding total hours of operation, it is not possible from the reports to determine how many hours the unit operated on coal and how many on gas. In addition, there was a wide variation in test results between the three sets of stack tests. For all of these reasons, the Division felt that at this time an analysis based on stack test data would be speculative and as a result such an analysis has not been provided.

V. Conclusion

The Division has noted its concerns with EPA's Order in this Addendum and the accompanying cover letter. Despite these concerns, the Division has fully complied with the Order by providing a more specific and fulsome response to specified public comments. In doing so, the Division has determined that no additional changes to the permit are necessary. Since no permit revisions are necessary, reopening under the provisions of either 40 CFR Part 70, §70.7(f) or §70.7(g) is not warranted.